REMARKS

Claims 1-18 are currently pending in the subject application and are presently under consideration. Claims 15-18 have been amended herein to rectify informalities.

Favorable reconsideration of the subject patent application is respectfully requested in view of the comments and amendments herein.

I. Objection to Claim 17 and Rejection of Claims 15-18 Under 35 U.S.C. §112, second paragraph

Claim 17 is objected to due to an informality and claims 15-18 are rejected under 35 U.S.C. §112, second paragraph, at least in part, for lacking antecedent basis. Claims 17 and 15-18 have been amended to resolve the aforementioned objection and rejections. Regarding claim 15, however, the Examiner states that at lines 22-23, "the patterned negative tone photoresist layers" lacks antecedent basis. This phrase should actually be read as ..."the patterned positive tone and the patterned negative tone photoresist layers..." – for which antecedent basis exists. Thus, Applicants respectfully request withdrawal of the objection and rejections.

II. Rejection of Claims 1 and 4-7 Under 35 U.S.C. §102(b)

Claims 1 and 4-7 are rejected under 35 U.S.C. §102(b) as being anticipated by Bartha (US 5,635,337). It is respectfully submitted that this rejection be withdrawn for at least the following reasons.

For a prior art reference to anticipate, 35 U.S.C. §102 requires that "each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950 (Fed. Cir. 1999) (*quoting Verdegaal Bros., Inc. v. Union Oil Co.*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)).

The Examiner asserts that Bartha anticipates the claimed invention. Applicants respectfully disagree. The present invention involves patterning a first image into a first photoresist layer and then curing the first patterned photoresist

layer. As described in the specification, the first patterned photoresist layer is polymerized or cured to make it chemically resistant to the effects of organic solvents and/or developers. The curing process or step is critical in preserving the integrity of the first patterned photoresist layer when subsequently patterning a second photoresist layer formed thereon. Bartha does not disclose or teach curing the lower photoresist layer. Rather, Bartha merely recites that the photoresist layer is developed and post-baked. Hence, Bartha fails to teach each and every element of the subject invention as recited in the claims.

In view of the foregoing, the rejection against claim 1 and claims 4-7, which depend therefrom, should be withdrawn.

III. Rejection of Claims 2-3 Under 35 U.S.C. §103(a)

Claims 2 and 3 are rejected under 35 U.S.C. §103(a) as being unpatentable over Bartha ('337) as applied to claim 1 above, and further in view of Chang (US 4,165,395). It is respectfully submitted that this rejection be withdrawn for at least the following reasons. Claims 2 and 3 depend from claim 1. Therefore, the arguments and remarks above with respect to Barth as applied to claim 1 also apply herein.

To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *See* MPEP §706.02(j). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *See In re Vaeck,* 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

In addition to the discussion set forth above with respect to claim 1, Chang fails to cure the aforementioned deficiencies of Bartha. The present invention as

claimed recites that the first patterned photoresist layer is cured prior to forming the second photoresist layer thereon. In particular, the curing comprises irradiating the first patterned photoresist layer with ultraviolet light at an energy dose and duration sufficient to make the first patterned photoresist layer chemically resistant to organic solvents and developers. Thus, the ultraviolet irradiation exposure effectively polymerizes and preserves the images formed in the first photoresist layer.

Contrary to the subject invention, Chang merely describes that a lower photoresist layer is exposed to x-ray or ultraviolet radiation and then developed to yield a very high aspect ratio. More specifically, Chang states:

> ... [A] wafer or a mask plate is covered with a layer of resist 11 which is sensitive to radiation from the X-ray to the optical range of frequencies... Next, a thin metallic film 12 ... is deposited on top of resist 11. ... Above film 12, a layer of an electron beam sensitive ... resist 13 ... is deposited...
>
> In FIG. 1B, there are shown holes 14 in resist 13 ... when the resist is developed.
>
> In FIG. 1C, the product of the steps of FIG. 1B is shown after the metallic film 12 has been removed through the holes in resist 13...
>
> FIG. 1D shows the product of the steps of FIG. 1C after it has been subject to exposure by an actinic radiation in whichever frequency range to which the resist 11 is sensitive. The ***portions of the resist 11 below the holes 14 are then exposed and subsequently developed to expose the substrate 10***. (col. 3, ll. 56 – col. 4, ll. 44).

As can be seen from the above, Chang simply states that the lower resist is exposed to the actinic (x-ray or ultraviolet) radiation such that ***those portions that are exposed are developed and essentially removed to yield the holes 14***. Thus, Chang's ultraviolet or x-ray radiation exposure causes the removal of the exposed material.

Moreover, Chang's actinic radiation exposure contradicts that of the subject invention. In fact, Chang teaches away from preserving a patterned photoresist layer via exposure to the ultraviolet radiation. Hence, one of ordinary skill in the art would not have been motivated by Chang to irradiate the first patterned photoresist layer using ultraviolet light to stabilize and/or preserve the

images patterned therein, as claimed in the present invention. Moreover, the Federal Circuit has held that teaching away from the art of the subject invention is a *per se* demonstration of lack of prima facie obviousness. *In re Dow Chemical Co.*, 837 F.2d 469, 5 USPQ2d 1529 (Fed. Cir. 1988).

Hence, Chang fails to teach or suggest the claimed invention alone or in combination with Bartha. Furthermore, Chang fails to provide the requisite motivation to modify Bartha in order to perform the subject invention.

In view of the foregoing, the rejection should be withdrawn.

IV. Rejection of Claim 8 Under 35 U.S.C. §103(a)

Claim 8 is rejected under 35 U.S.C. §103(a) as being unpatentable over Bartha ('337) as applied to claim 1 above, and further in view of Chang ('395). It is respectfully submitted that this rejection be withdrawn for at least the following reasons.

Claim 8 depends from claim 1. The arguments set forth above with respect to Bartha as applied to claim 1 apply herein as well. As previously asserted, Chang fails to cure the aforementioned deficiencies. In particular, Chang fails to teach or suggest curing the first patterned photoresist layer as further explained above with respect to claims 2 and 3, which also depend from claim 1.

In view of the foregoing, it would not have been obvious to one of ordinary skill in the art to modify Bartha in view of Chang to perform the present invention. Therefore, the rejection should be withdrawn.

V. Rejection of Claims 9-13 Under 35 U.S.C. §103(a)

Claims 9-13 are rejected under 35 U.S.C. §103(a) as being unpatentable over Bartha ('337) in view of Chang ('395). It is respectfully submitted that this rejection be withdrawn for at least the following reasons.

As previously discussed, the claimed invention recites that the first patterned photoresist layer is irradiated with ultraviolet light to stabilize the first patterned photoresist layer before the second photoresist layer is formed thereover. In particular, the irradiation of the first patterned photoresist layer occurs at an energy

dose and duration sufficient to make the first patterned photoresist layer chemically resistant to organic solvents and developers. Thus, the ultraviolet irradiation exposure effectively preserves the images formed in the first photoresist layer.

Contrary to the subject invention, Chang merely describes that a lower photoresist layer is exposed to x-ray or ultraviolet radiation and then developed to yield a very high aspect ratio. More specifically, Chang states:

> ... [A] wafer or a mask plate is covered with a layer of resist 11 which is sensitive to radiation from the X-ray to the optical range of frequencies... Next, a thin metallic film 12 ... is deposited on top of resist 11... Above film 12, a layer of an electron beam sensitive ... resist 13 ... is deposited...
>
> In FIG. 1B, there are shown holes 14 in resist 13 ... when the resist is developed.
>
> In FIG. 1C, the product of the steps of FIG. 1B is shown after the metallic film 12 has been removed through the holes in resist 13...
>
> FIG. 1D shows the product of the steps of FIG. 1C after it has been subject to exposure by an actinic radiation in whichever frequency range to which the resist 11 is sensitive. ***The portions of the resist 11 below the holes 14 are then exposed and subsequently developed to expose the substrate 10***. (col. 3, ll. 56 – col. 4, ll. 44).

As can be seen from the above, Chang simply states that the lower resist is exposed to the actinic (x-ray or ultraviolet) radiation such that those portions that are exposed are developed and essentially removed to yield the holes 14.

As stated earlier, Chang's actinic radiation exposure contradicts that of the subject invention. In fact, Chang teaches away from preserving a patterned photoresist layer via exposure to the ultraviolet radiation. Hence, one of ordinary skill in the art would not have been motivated by Chang to irradiate the first patterned photoresist layer using ultraviolet light to stabilize and/or preserve the images patterned therein, as claimed in the present invention. Recall that the Federal Circuit has held that teaching away from the art of the subject invention is a *per se* demonstration of lack of prima facie obviousness. *In re Dow Chemical Co.*, 837 F.2d 469, 5 USPQ2d 1529 (Fed. Cir. 1988). Moreover, it would not have been obvious to one of ordinary skill in the art at the time the invention was made to modify Bartha in

view of Chang to perform the present invention. Therefore, the rejection should be withdrawn.

In view of the foregoing, the rejection should be withdrawn.

VI. Rejection of Claim 14 Under 35 U.S.C. §103(a)

Claim 14 is rejected under 35 U.S.C. §103(a) as being unpatentable over Bartha ('337) in view of Chang ('395) and further in view of Dai ('076). It is respectfully submitted that this rejection be withdrawn for at least the following reasons.

Claim 14 depends from claim 9. The arguments set forth above with respect to Bartha as applied to claim 9 apply herein as well. Dai fails to cure the aforementioned deficiencies of Bartha and Chang with respect to at least claim 9 of the subject application. That is, Dai does not teach or suggest irradiating a first patterned photoresist using ultraviolet light in order to stabilize the images formed in the patterned photoresist layer. Thus, Bartha, Chang, and Dai, either alone or in any combination fail to teach or suggest each and every element of the claimed invention. Hence, the subject application would not have been obvious to one of ordinary skill in the art at the time the invention was made.

In view of the foregoing, the rejection should be withdrawn.

VII. Rejection of Claims 15-18 Under 35 U.S.C. §103(a)

Claims 15-18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Bartha ('337) in view of Chang ('395). It is respectfully submitted that this rejection be withdrawn for at least the following reasons. Claims 15-18 depend from claim 9. The arguments set forth above with respect to Bartha as applied to claim 9 apply herein as well.

In addition, the Examiner acknowledges that Bartha in view of Chang and Dai ('076) differ from the present invention in failing to teach wherein etching the at least one insulative layer through the patterned negative tone photoresist layer and the second patterned photoresist layer further comprises employing an etch chemistry that ablates a pre-determined amount of the patterned positive tone

photoresist layer during the etching process without substantially affecting the patterned negative tone photoresist layer, as recited in present claim 17 and wherein the etch chemistry is highly selective to the patterned negative tone photoresist layer and to the at least one insulative layer than to the second patterned photoresist layer, as recited in present claim 18.

Furthermore, Dai fails to make up for the aforementioned deficiencies of Bartha and Chang with respect to claim 9. In particular, Dai does not teach or suggest irradiating a first patterned photoresist using ultraviolet light in order to stabilize the images formed in the patterned photoresist layer. Thus, Bartha, Chang and Dai, either alone or in any combination fail to teach or suggest each and every element of the claimed invention. Hence, the subject application would not have been obvious to one of ordinary skill in the art at the time the invention was made.

Thus, for the aforementioned rationale, the rejection should be withdrawn.

VIII. Conclusion

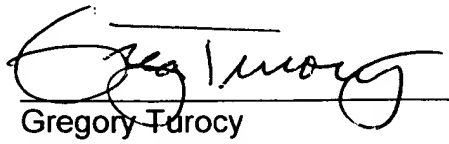
The present application is believed to be condition for allowance in view of the above comments and amendments. A prompt action to such end is earnestly solicited.

In the event any fees are due in connection with this document, the Commissioner is authorized to charge those fees to Deposit Account No. 50-1063.

Should the Examiner believe a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact applicant's undersigned representative at the telephone number listed below.

Respectfully submitted,

AMIN & TUROCY, LLP



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